Theater Forecast Unit Forecast Review

Date: 7 DECEMBER 1998 Season: WINTER Forecaster: C. Preston

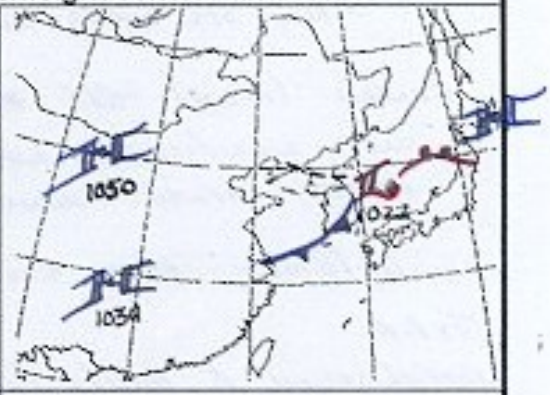
Reason for review: Thunderstorm that occurred over (SC) (SD) at 1600L (07Z)

Synopsis Situation

Include heights/pressures, isotherms, troughs, ridges, pressure/height centers and values

300 MB: 07/00Z

500 MB: 07/00Z



Surface: 07/00Z

Initial Forecast Reasoning: Longwave trof located manchuria, extending down over the Gulf of Pohai. MAIN Branch of PFJ located over Cen Mongolia moving over the Shantung Pen along the DMZ over the Kor Pen and running over the Russian Far East. MAIN Branch Jet maximum had deepened 2mb past 12 hours and after Post analysis, it had deepened 1°. 500mb Major slow trof located at approx 119E - 45-40°N (manchuria, Korea, Gulf of Pohai) supporting unstable wave (1022mb) 2° East of cont steep. system had deepened 6mb Post 24hrs, as it moved into the base of the Longwave trof. metsat also supported this with ⟶ cooling clouds tops along the warm sector at baroclinic leaf. wave was moving E-NE at 15kts (30kts at 20mb) with cold frontal boundary moving S-SE at 10-15kts. Post 12 hrs wave had slowed 10kt's due to increase in cyclogenesis. 07/00Z SFC anal did pick-up on a Post-frontal trof (COW) along the NRN regns of the Rok. NOGAPS model also pick-up on Low-Level circulation of Post-frontal trof but was position 1° too far north. Post frontal trof initially showed little to no vertical extent. Metsat did pick up on trof of enhanced clouds over the west sea.

A west Lake Baikal High was located over the Gobi Desert (1050mb) and had built 2mb the Past 12hrs. System was moving S-SE following the strongest caa.

At 0/1800 -20 isotherm was at approx 16,000 ft. by 07/00 had dropped to 14000 ft. This coincided with frontal passage at initial onset of CAA.

After frontal passage, obs. from across the Rok showed a Gradual cooling of Temps and an increase in altimeter + barometric pressure Resulting in an increasing of a stabilizing atmosphere.

Thus initially, Forecast was the onset of cold air cu-sc with little to no Expected development.

Other models: MM5 did not pick-up on TSTMS, however did show precip.

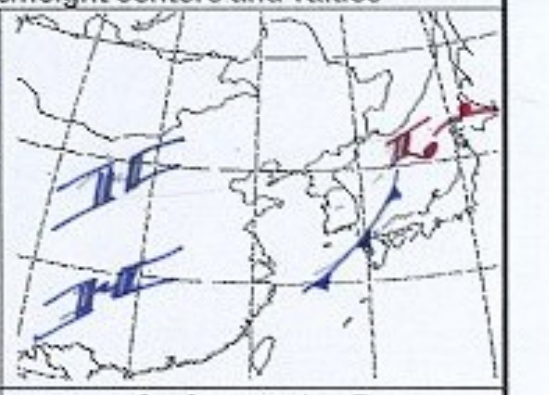
Post Analysis

ON BACK ⟶

Include heights/pressures, isotherms, troughs, ridges, pressure/height centers and values

300 MB: 07/12 Z

500 MB: 07/12 Z



Surface: 07/12 Z

Kunsan (AFWA) MMS for Dec 7 06Z
- Indicated Clouds up to 9,000 ft MSL
- 3 hr precip totals ranging from .01 - .03 for @ 36 hr fd.
- NW Sfc winds switching NE at 08/00Z

Kunsan (AFWA) NMRF Meteograms
Only significance was initial 7Dec
Precip showed "Snowshowers" as opposed to snow.

At 07/0742Z RKJK first reported TSRA. At 07/0721 RKSC first reported TSRA.

Initialization of Models (NOGAPS & NMRF) found no major discrepancies.
300mb: Jet Placements of NKN & SRN branch did very well. NKN branch diving south of the Shantung Pen over the DMZ. SRN branch over ERN China so. of Kyushu and was having no affect to weather over the Pen.
500 mb. Placement of M/SWV over Shantung Pen stacking down to Sfc Low over East Sea was Good as well as Amplitude when Compared to VA.
700mb: Moisture was overdone when compared to SAT over Pen, but this Feature is not uncommon with NOGAPS.
Sfc. Sfc Low on both NMRF & NOGAPS compared well with 00Z Sfc anal.
When comparing 07/00 & 07/06Z Skew-T (RKSG) sounding of OSAN showed that the -20 isotherm had lowered 640ft from 160ft to 120ft. Overall Skew-T showed only minor destabilization of the atmosphere
Short-Range forecaster & Met-Watch believed that a Thunderstorms advisory was not warranted due to the weak instability present.
Initial iteration of the Skew-T showed little to no significant increase in the lapse rates or destabilization, thus no advisory was sent.

Post Analysis Reasoning: Most Thunderstorms over Korea are the Air Mass Type (summer), However, other affects can aid in the formation of TSTRMS, such as. orographic, cold core, and with a frontal boundary helping lift the warmer, moist less dense air.

In this case, as analyzing the DATA, The Met-watch misinterrelated the location of the -20 isotherm. (Initially Thought -20 was at 220ft.) after inital interrobation of Doppler radar had build-ups 110 -120ft.

Re-analyzing DATA and SKEW-T believe the minimal conditions for TSTRMS were not met. When reviewing stability indices at 9 o'clock.

Indices needed for good Thunderstorm development

				07/0000Z	07/0600Z
CT (Cross Totals)		20	CT	-9.4	17.8
VT (Vertical Totals)	LESS THAN 28 EXPECT NO TSTM	← ≥26	VT	23.6	21.2
TT (Total Totals)		44-48	TT	14.2	39.0
SSI (Showalter Index)		3 to 1 NEED STRONG TRIGGER	SSI	14.4	12.3
LI (Lifted Index)		0 to -2	LI	11.8	10.5
TI (Thompson Index)	LESS THAN 20 NONE	20-29 WEAK	TI	-27.4	-2.5
KI (KI %)			KI	-15.4	6%
KO (Likelihood of TSTM)			KO	12.8	7.1
WBZ		5,000 to 11,000 WEAK	WBZ	1800ft	1700ft

Lessons Learned: Lessons Learned from this event warrants a more vigilant Met Watch as well as attention to detail.

In addition, although uncommon in Korea, winter thunderstorms are possible. The importance of a good initial interrogation of synoptic situation is a must! As well as the importance of the -20° isotherm being a good tool for Thunderstorm Top Threshold.

Team Chief:	Superintendent:	IM:
	BOTTOM LINE ON THIS REVIEW IS THAT ALTHOUGH THE INDICIES DIDN'T INDICATE ANYTHING OTHER THAN STABLE CONDITIONS AFTER FROPA, THE POST COLD FRONTAL TSTM WAS MISSED (TRIGGER) AND A FORECAST SOUNDING WAS NOT ACCOMPLISHED	